

Advanced QED methods for future accelerators

Tuesday, 3 March 2009 - Wednesday, 4 March 2009

Cockcroft Institute

Scientific Programme

Questions for the workshop to address:

<u>Introductory questions: </u>

1. What are the main future accelerator projects where intense field QED(IFQED) calculations will be pertinent?
2. How well we need to know the polarisation state of future particle beams in order to make the precise physics measurements required in future experiments?

<u>Theoretical questions:</u>

1. How is an intense field included in QED (IFQED) calculations?
2. What is the Volkov solution, how is it used in IFQED calculations and what are the main results using it?
3. What is the 'Operator method' and what is its range of applicability?
4. What is the form of the strong electromagnetic field at the Interaction Point(IP) of a future particle collider?
5. Can the IFQED propagator reach the mass shell and how large are the transition rates of higher order IFQED processes?

<u>Simulation questions:

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1. What theoretical models are simulated in contemporary beam-beam simulation software (e.g. CAIN and Guinea-pig)?
2. Are the spin dynamics models in CAIN and Guinea-pig consistent?
3. What are the current predictions for depolarization at the IP of future machines, and what are the uncertainties in these numbers?
4. What theoretical refinements are required to reduce the uncertainty in polarization measurements and simulations?

IFQED applications:

1. Do IFQED calculations have further applications to other processes in future accelerators?